Recent Generalization Development and Road Ahead

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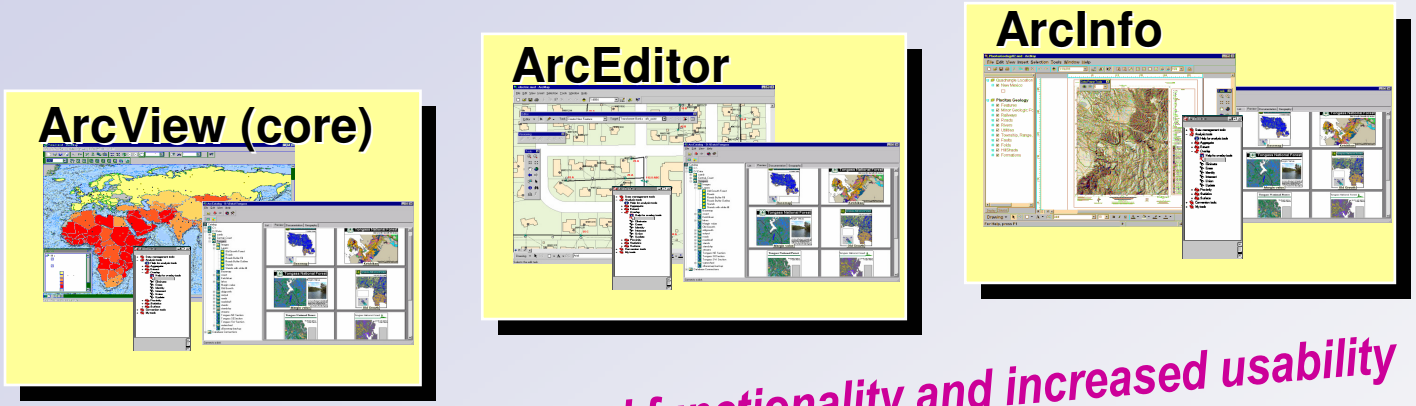
- Geoprocessing in ArcGIS
- Recent generalization development
- Road ahead

Geoprocessing in ArcGIS

ArcGIS - the new generation of ESRI software



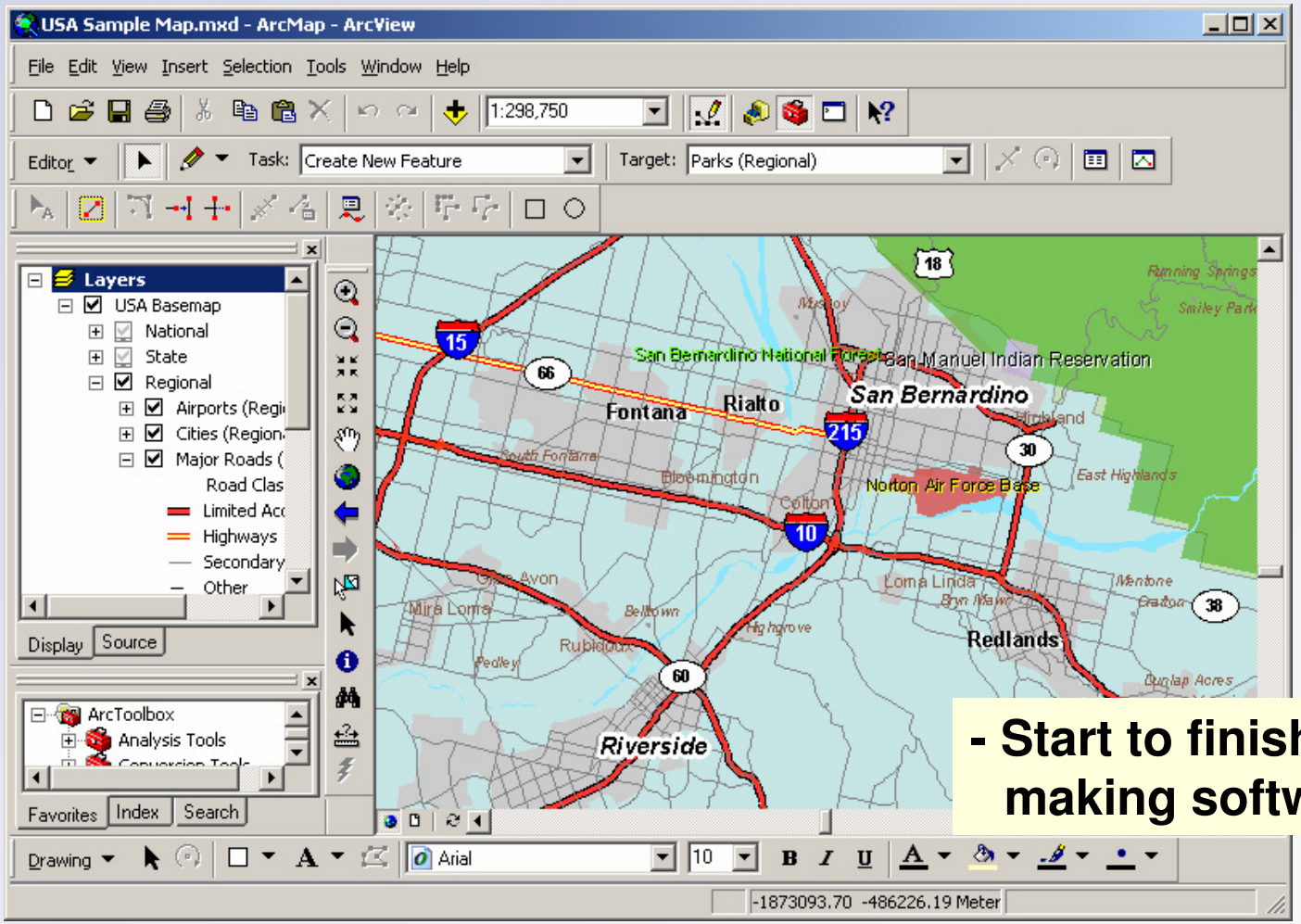
Additional functionality and increased usability and interoperability

- A single, unified, scalable, object-oriented GIS software with COM-based components, and geodatabase data model
- Unifies the traditional ArcView and ArcInfo environments
  - common architecture
  - same underlying executables and user interface
  - common extension models

Core components:

ArcMap

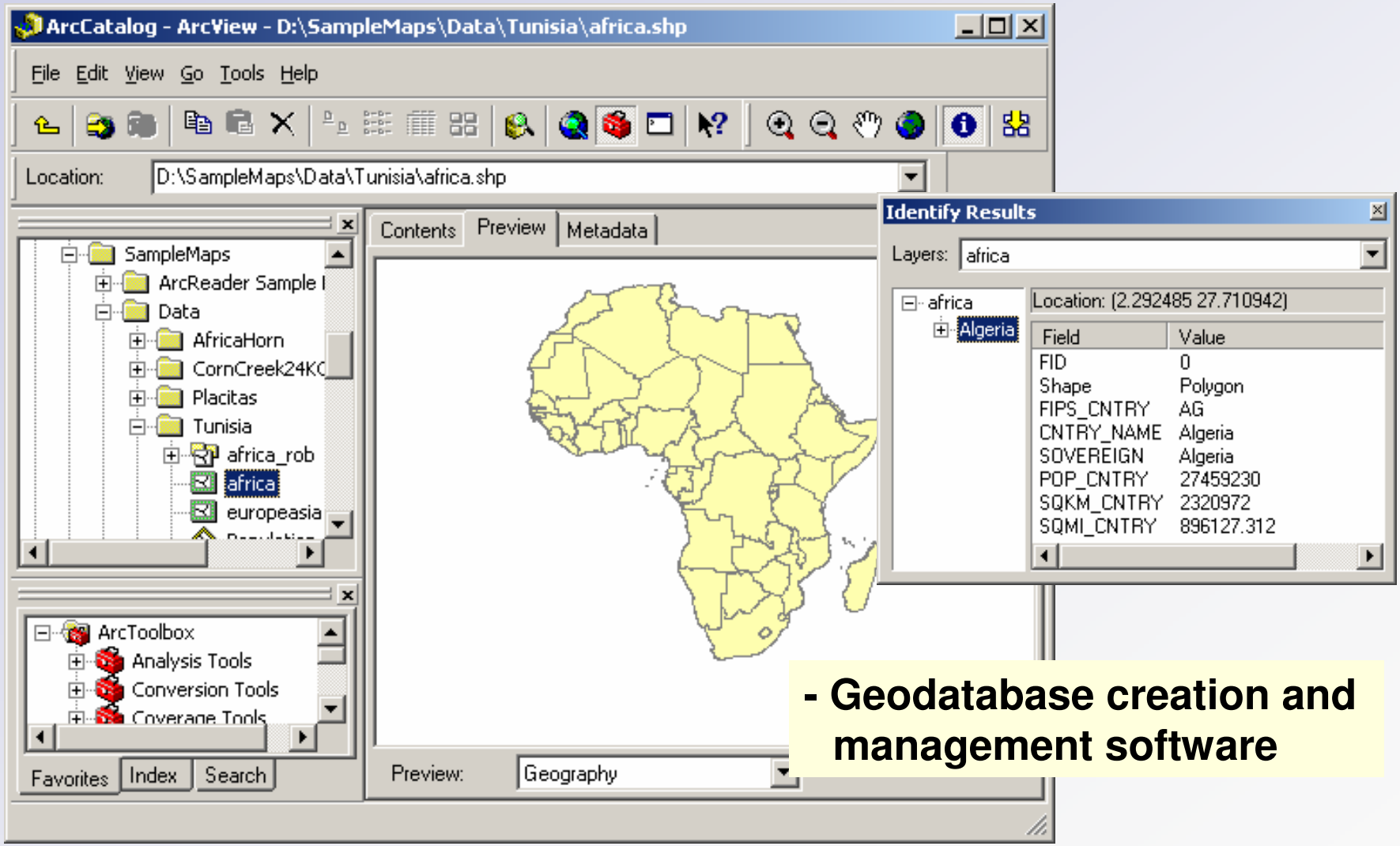
- Data compilation, editing
- Advanced symbology, map layout and composition, automated text placement
- Many export, printing options and formats



- Start to finish map making software

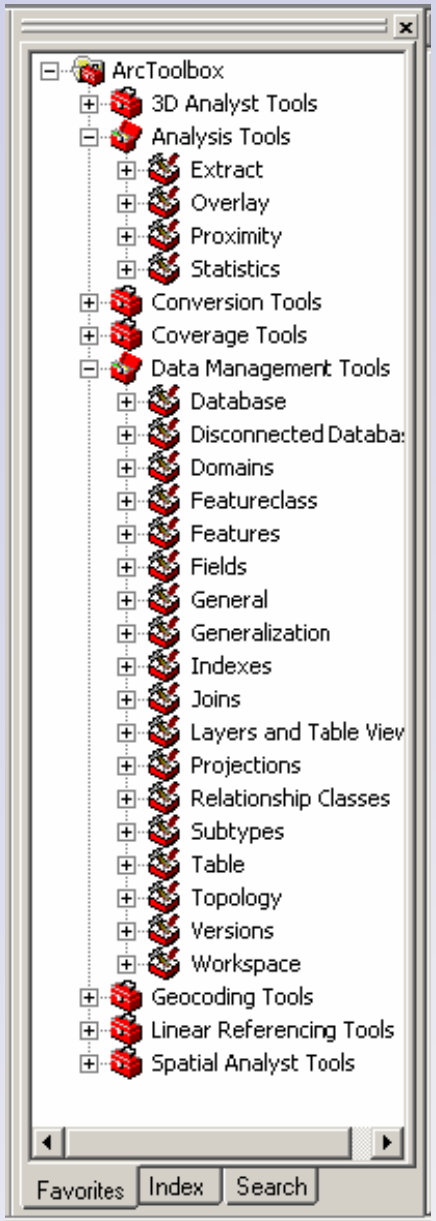
ArcCatalog

- Create and access geodatabases, datasets, feature classes, tables, subtypes, domains, relationships
- Quick preview and display of the contents
- Read and create metadata



- Geodatabase creation and management software

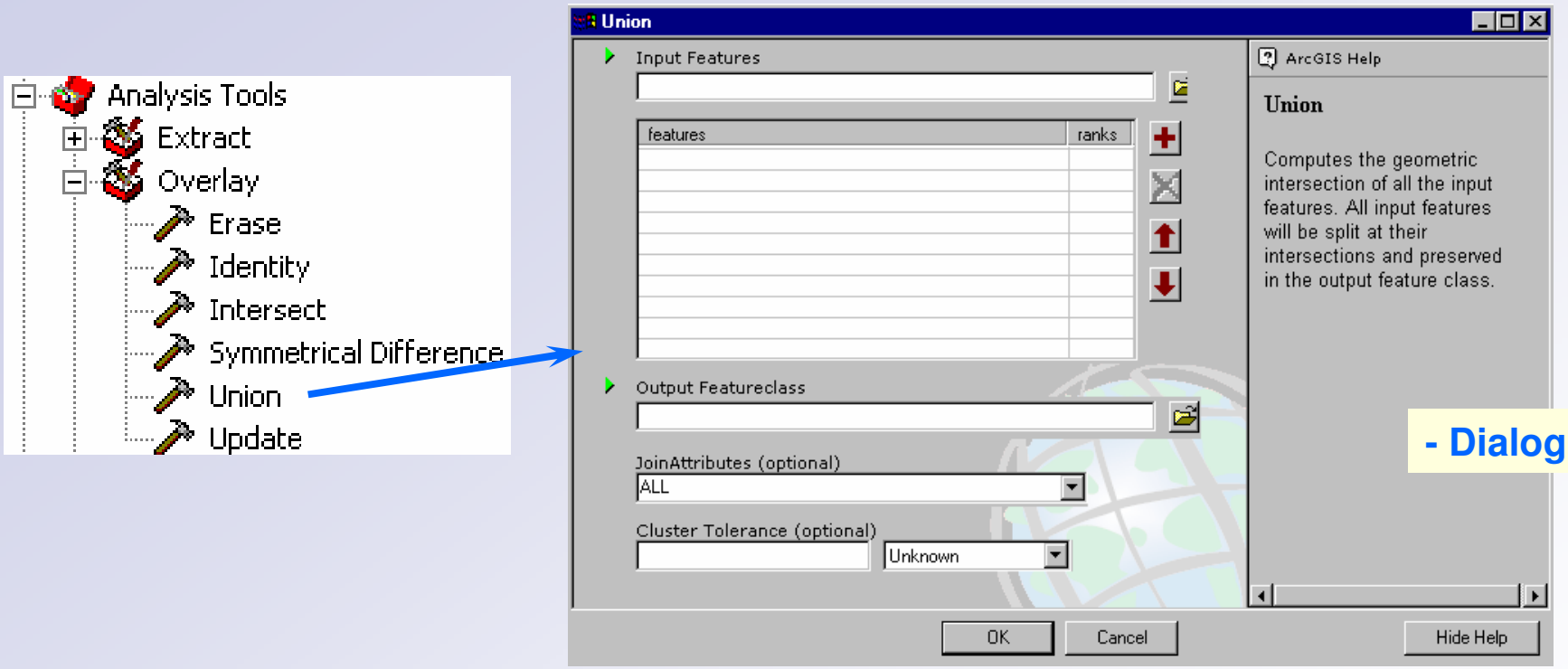
Geoprocessing – the framework for core GIS operations



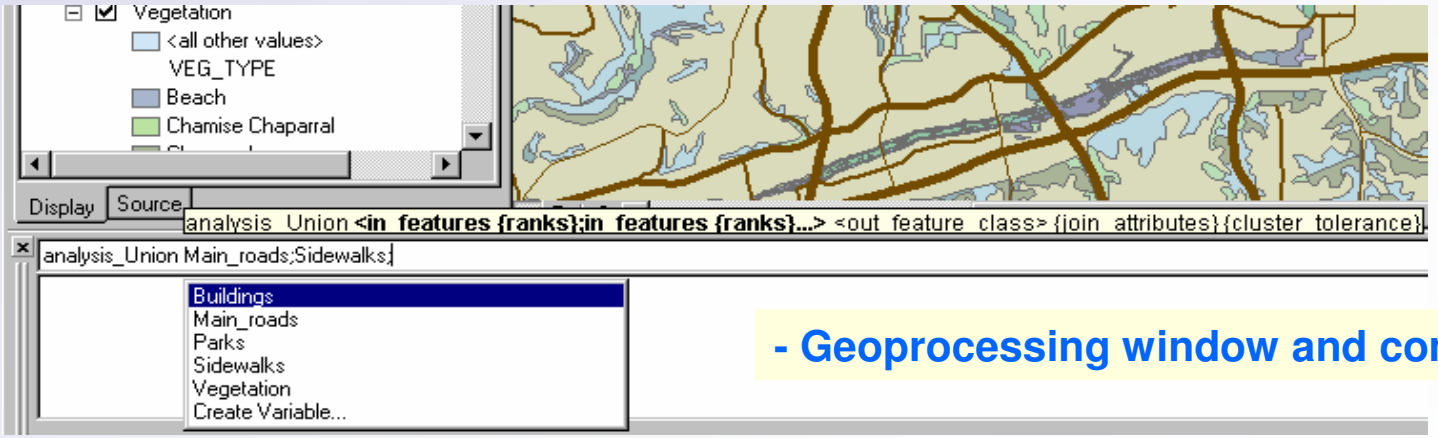
- **Data format conversion**
- **Data manipulation**
  - Add, Delete, Append, Split, …
- **Spatial analysis**
  - Union, Intersect, Buffer, …
  - Statistics …
- **Process modeling**

Data + tool --> Derived Data

To perform geoprocessing tasks

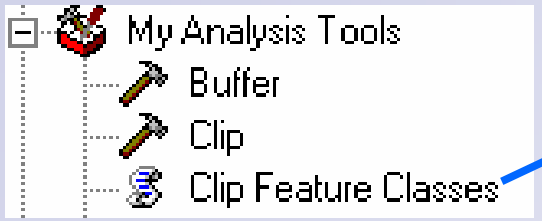


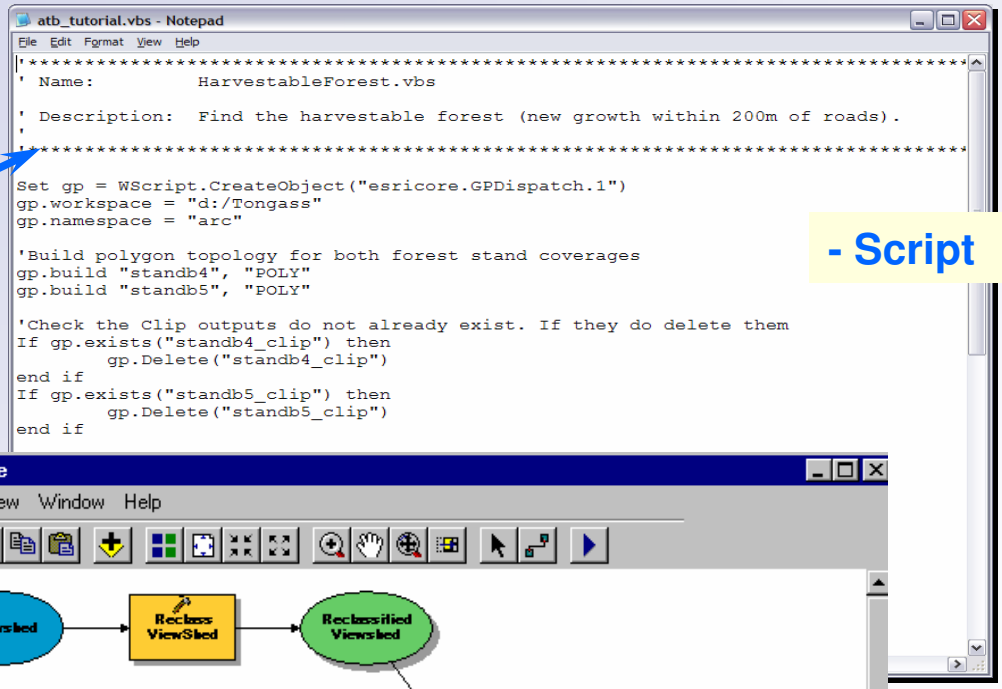
- Dialog



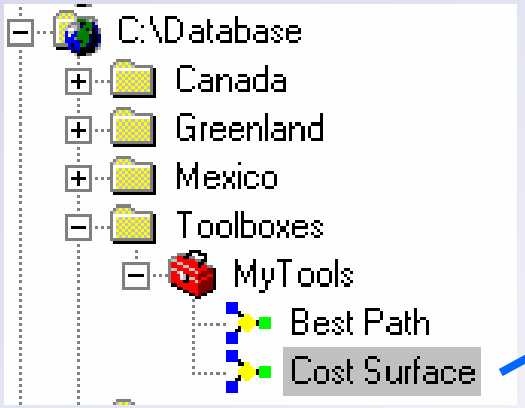
- Geoprocessing window and command line

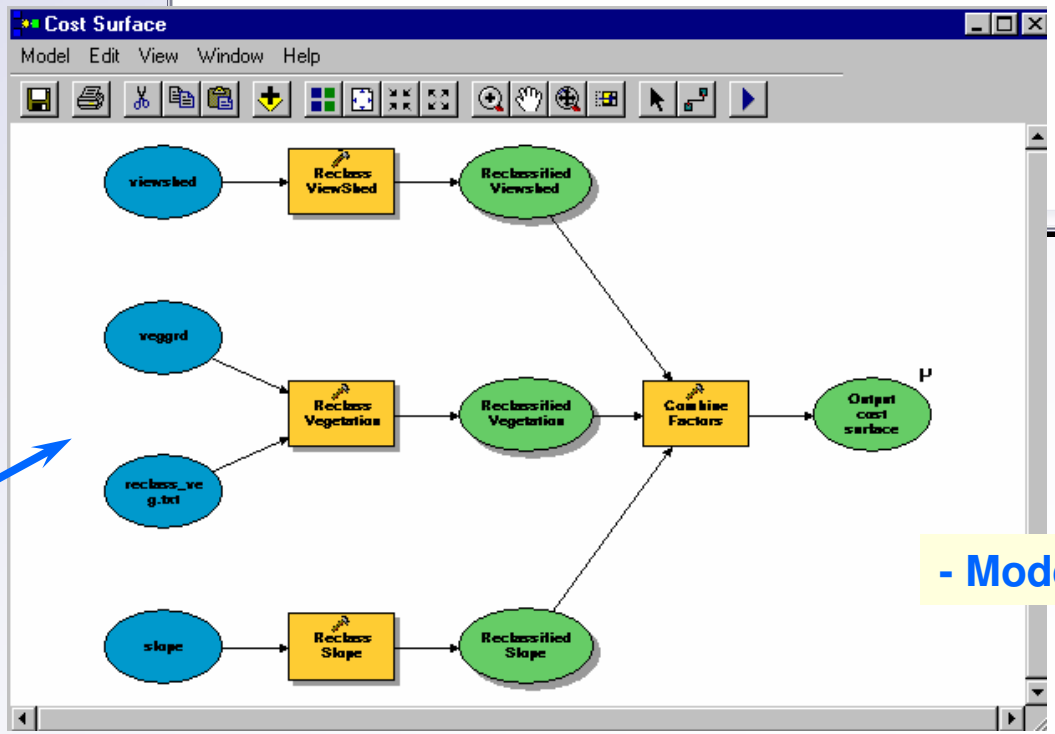
To perform geoprocessing tasks





- Script





- Model

Recent Generalization Development

- the integration of generalization into ArcGIS …

- **Ultimate goal**:
  To support database generalization and cartographic generalization in a flexible and user-controlled environment with maximum automation and productivity

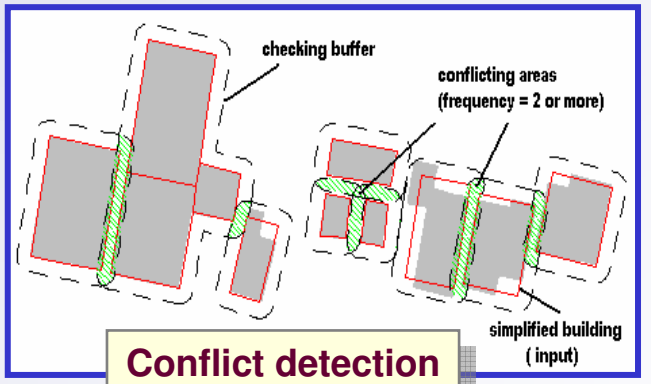
- **Newly available**:
  Topology engine
  TIN engine, enhanced to support generalization

The beginning phase

Re-evaluate existing generalization tools and techniques

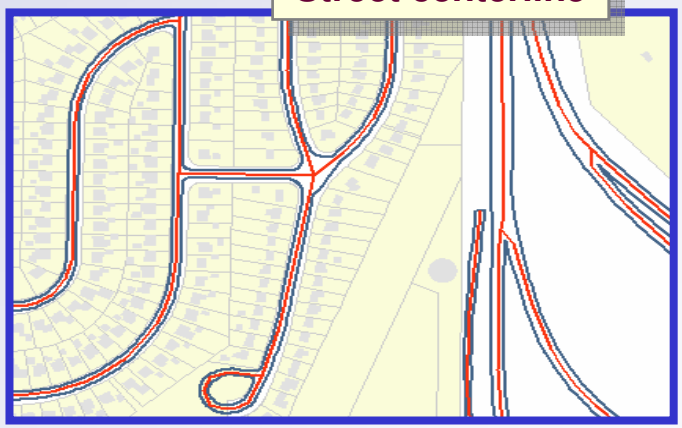
Line simplification

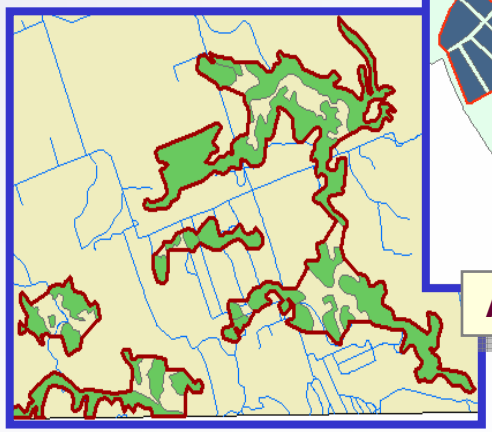
Building simplification

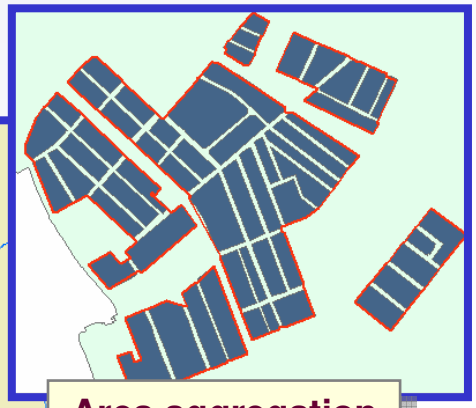


Conflict detection

Street centerline

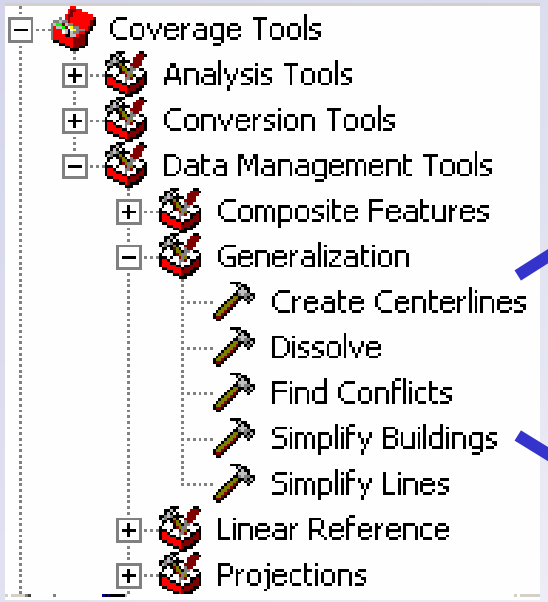


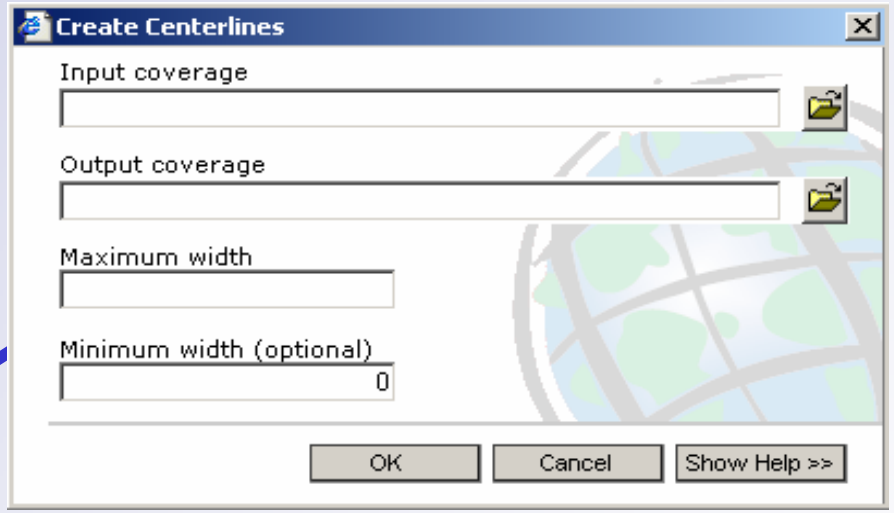




Area aggregation

Port coverage generalization tools

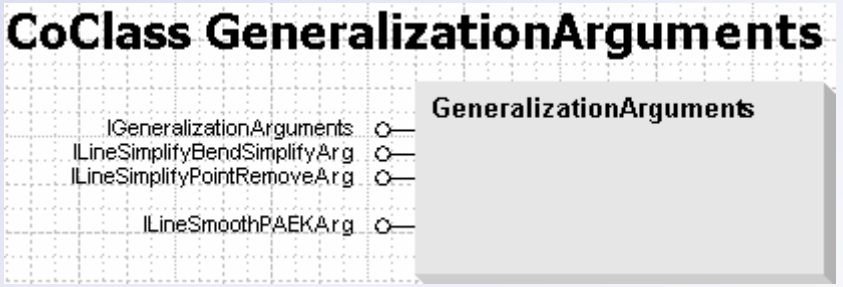


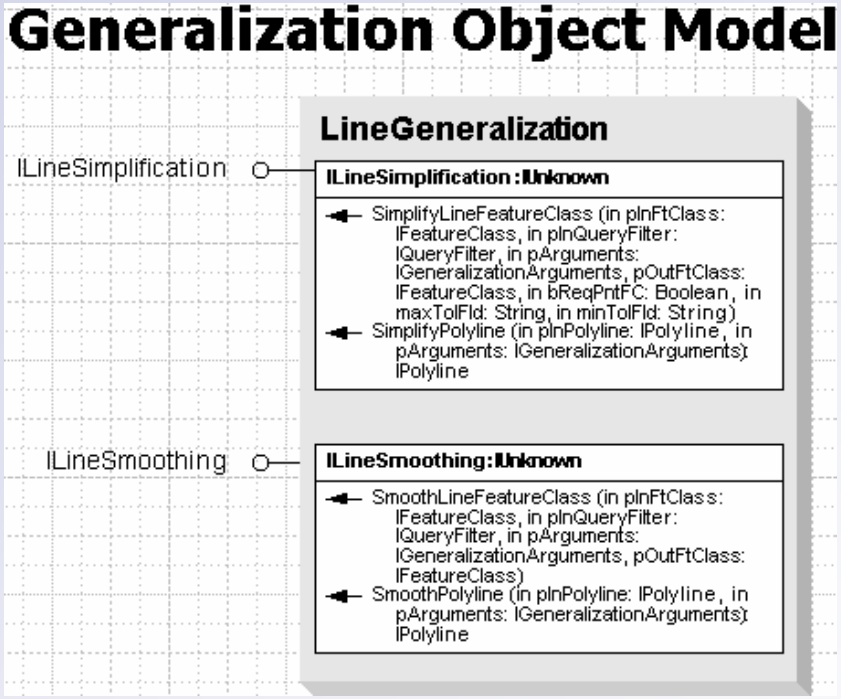


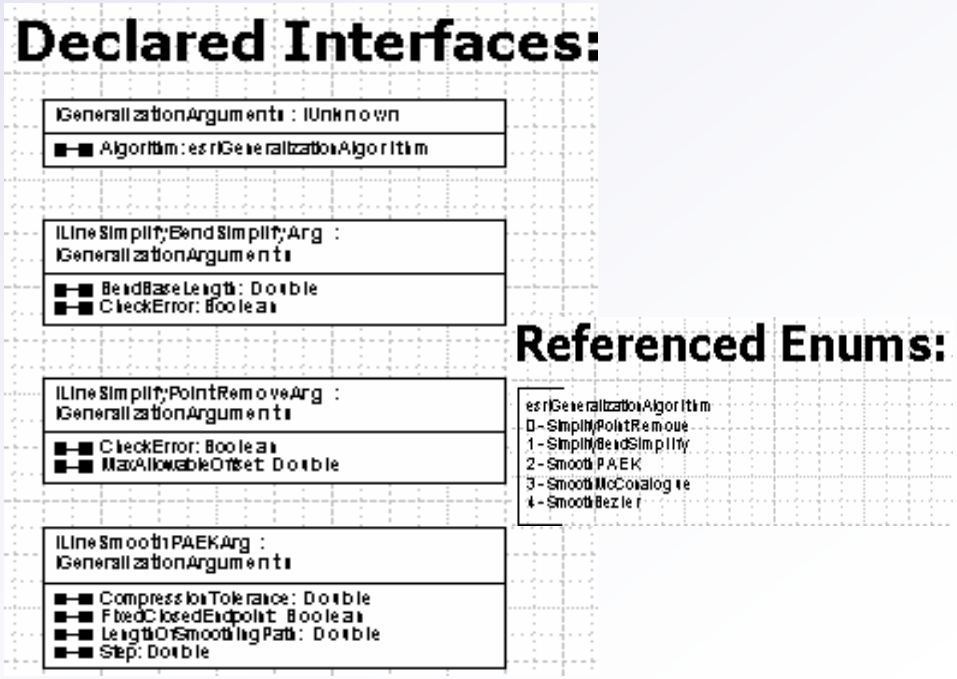
Create generalization functions in ArcObjects library

ArcObjects - the collection of COM-based ArcGIS components

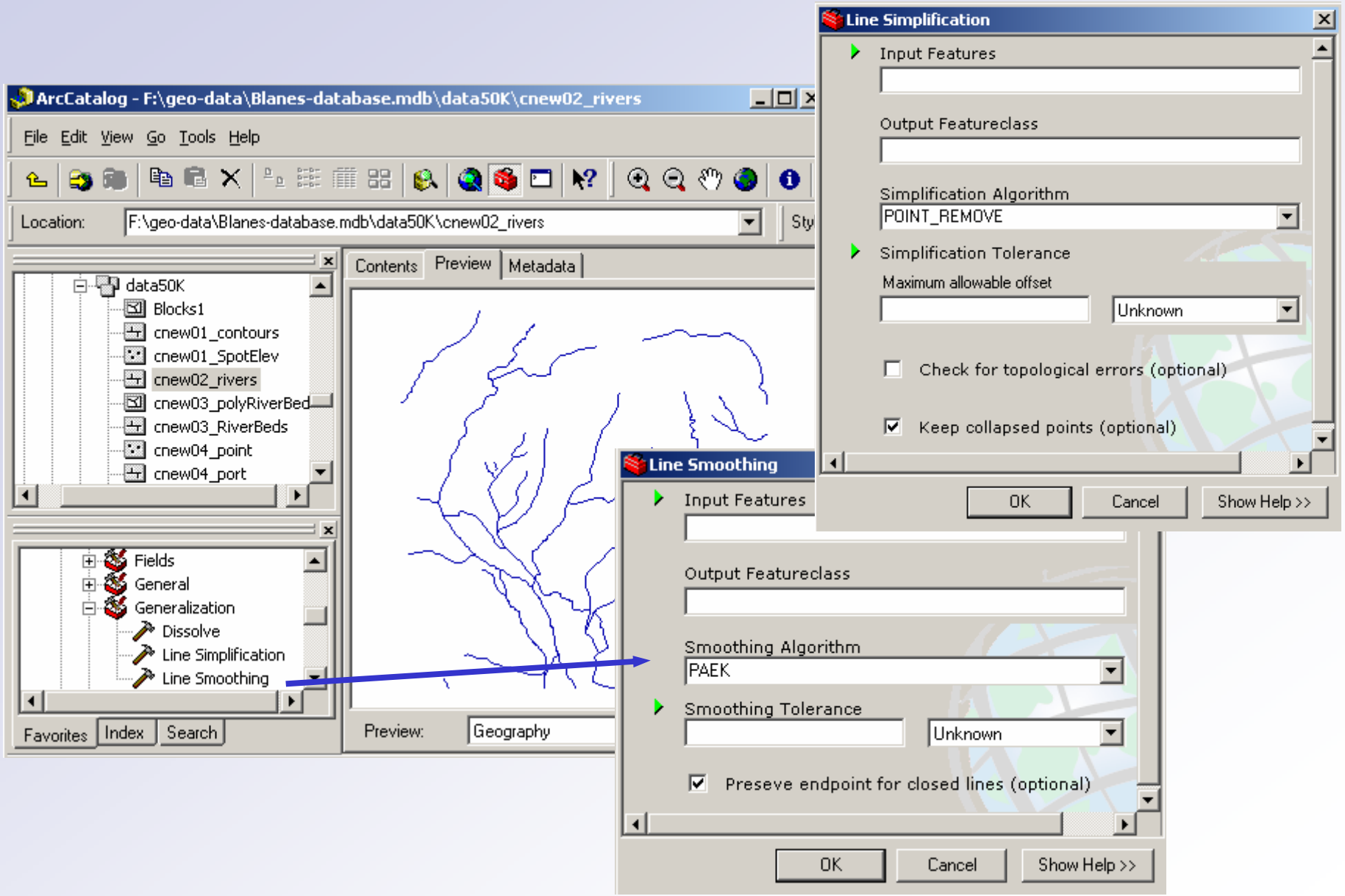
- The development platform for ArcGIS Desktop applications
- The open programming environment makes the full capability of ArcGIS accessible to all







Build Geodatabase feature generalization tools



Focus on generalization quality and data integrity

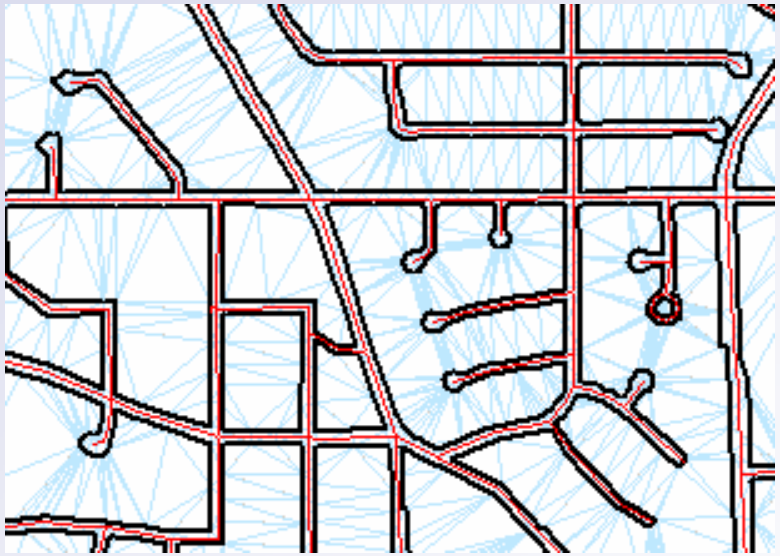
- **Improve line simplification quality**
  - Localize and resolve topological errors
  - Handle shared geometry
- **Carry relationships in the generalized data to the source data**
  - One-to-one relation via Oids
  - One-to-many relation tables
- **Provide ways to keep track of “lost” data**
  - Zero-length lines as result of simplification
- **Flag problems and generalization status**
  - Less generalized features (line simplification)
  - Unresolved cases (line smoothing)

Road ahead

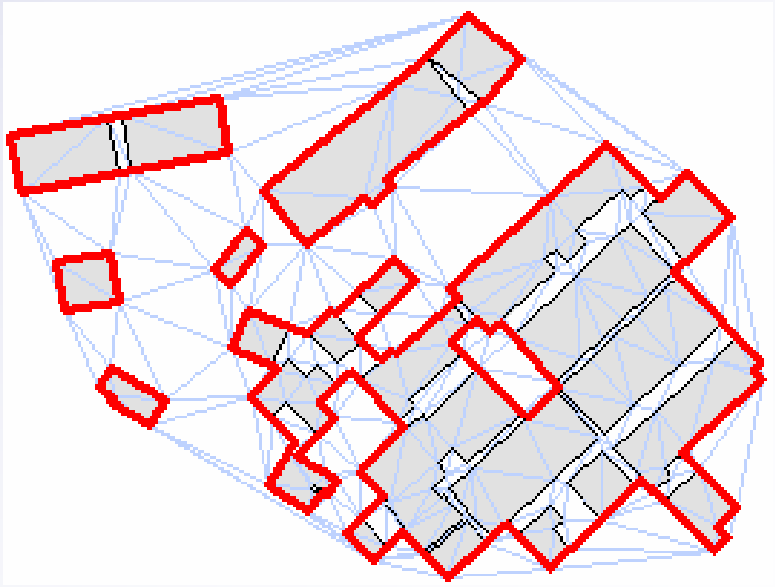
- Extend the ArcObjects library
- Add a full set of generalization tools
- Integrate generalization capability in the editing and map compilation environments
- Build towards a rule-driven, intelligent generalization engine
- Create smart features and enrich databases
- Meet the requirements for on-demand generalization and location-based mapping

Working on new algorithms …

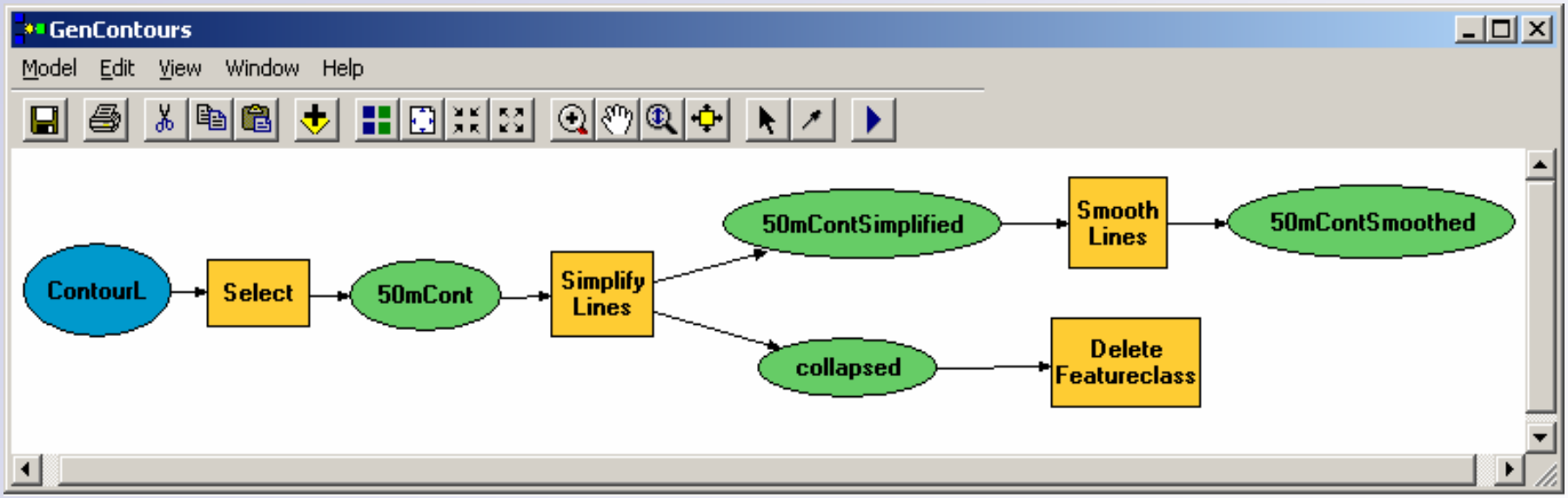
Dual-line-to-centerlineCollapse



Area-Aggregation



Deriving generalization models …



Other ongoing research and investigations …

- **Database cartography**
  - Evolving towards data driven “smart maps”
  - Using the database to automate decision-making and processes for making maps
- **Cartographic features and multiple scale representations**
  - Multiple geometry linked to single source data
  - Drawing rules (symbology, placement, scale …)
- **Updating generalized maps**